

REMARKS

I. Status of the Application

Claims 1-36 are pending in this application. In the December 23, 2003 office action, the Examiner:

1. Objected to the Specification because of informalities;
2. Withdrew claims 1-15 and 27-36 from consideration as being drawn to a non-elected invention;
3. Rejected claims 16-19 and 25 under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. U.S. 5,619,142 to Schweer et al. (“Schweer”);
4. Rejected claim 26 under 35 U.S.C. § 103(a) as allegedly being obvious over Schweer in view of Horowitz & Hill, The Art of Electronics (Cambridge University Press, 1989)(“Horowitz and Hill”); and
5. Deemed claims 20-24 allowable if rewritten to incorporate all of the limitations of the base claim and any intervening claim.

In this response, applicants traverse the prior art rejections of claims 16-19, 25 and 26. Applicants have canceled claims 1-15 and 27-36 without prejudice, and have added new claims 37-40. Claim 16 has been amended. Applicants respectfully request reconsideration and allowance of the claims in view of the foregoing amendments and the following remarks.

II. Applicants Have Addressed the Informalities in the Specification

In the December 23, 2003 office action, the Examiner noted an informality in the energy equation on page 2 of the specification. In particular, the Examiner noted “Page 2

of the specification recites an equation for energy use which appears to be missing a summation symbol and sample time differential".

Applicants have addressed this informality by adding the summation symbol as suggested. With regard to the "sample time differential", it is respectfully submitted that the equation as amended clearly conveys enough information to enable one of ordinary skill in the art to carry out an energy calculation. Because applicants have employed discrete sample values n , and have expressed the value as a discrete summation value using the symbol Σ , it is respectfully submitted that the equation is sufficiently accurate as provided. If applicants had used an integral symbol, then the use of a time differential would be more appropriate.

In addition to the foregoing, the Examiner requested the applicant's cooperation "in correcting any errors of which applicant may become aware in the specification". (Office Action at p.2). Applicant reviewed the specification and noted similar errors, as well as one other inadvertent error, in similar power equations on pages 17 and 19 of the specification. Applicants have amended the specification to correct such errors.

In view of the foregoing, it is respectfully submitted that the Examiner's objections to the disclosure have been addressed.

III. The Prior Art Rejections are in Error

Claim 16 has been amended to address what amounts to be an inadvertent typographical error. The amendment does not affect the scope of the claims.

Claims 16-19 and 25 stand rejected as allegedly being anticipated by Schweer. As will be discussed below in further detail, Schweer fails to disclose or suggest every

element of any of claims 16-19 and 25. As a consequence, it is submitted that the rejections of those claims are in error and should be withdrawn.

A. The Present Invention

Claim 16 is directed to an apparatus for use in an electricity meter that is connected to an external transformer. By way of example, the external transformer may be an instrument transformer as is known in the metering art. The apparatus includes a memory and a processing circuit. The memory stores data representative of at least one error rating for the external transformer. The processing circuit is operable to obtain at least one electricity consumption measurement value in the form of a sampled current value or a sampled voltage value. The processing circuit is further operable to adjust the at least one electricity consumption measurement value using at least a portion of the stored data.

One notable feature of claim 16 is that the processing circuit adjusts a current sample or voltage sample. In other words, the processing circuit adjusts samples of voltage or current waveform, as opposed to adjusting energy values that are derived from waveform the waveform samples. Such derived energy values include power calculations, RMS calculations and the like. Further description of the embodiment of the invention claimed in claim 16 is provided in the specification as filed at page 18, line 21 to page 20, line 2.

B. Schweer

Schweer is directed to a sensor calibration technique for an electricity metering arrangement. Schweer employs calibration techniques to adjust for errors in the meter

sensing transformers. To this end, the metering device obtains RMS voltage and RMS current calculations, and then adjusts the RMS voltage and/or RMS current calculations using adjustment values derived from a calibration operation.

C. Schweer Does Not Adjust Current or Voltage Samples

Schweer fails to disclose or suggest a processing circuit operable to “adjust the at least one electricity consumption measurement value” wherein “the at least one electricity consumption measurement value [comprises] either a sampled current value or a sampled voltage value”, as called for in claim 16. In other words, Schweer does not teach the adjustment of a sampled current or voltage value, but rather the “average” or root-mean-square value of voltage or current waveform.

In a particular example, Schweer describes the adjustment of RMS values in the following passage:

The RMS amplitude value of each signal is determined by the EMP 54. This result is then scaled to arrive at the actual voltage or current. Scaling is performed using the slopes and offset factors determined during transducer characterization. These calibration factors, scaled appropriately, are stored in the EMP as part of the meter configuration.

(Schweer at col. 8, line 65 to col. 9, line 4). In other word, the *RMS* values, not the waveform samples, are scaled. *RMS* values do not merely constitute adjusted or calibrated digital samples, but rather represent a fundamentally different value. In particular, *RMS* values actually represent the average magnitude of a waveform, and not samples of the waveform. Page 19 of the specification as filed clearly distinguishes the claimed adjustment of samples from the adjustment of derived energy values such as *RMS* voltage, *RMS* current, watt-hours, reactive energy, and so forth. (Application at p.19, line 20 to page 20, line 2).

Because Schweer fails to disclose or suggest the adjustment of current or voltage *samples*, it is respectfully submitted that Schweer fails to teach or suggest each and every element of claim 16.

In the rejection of claim 16, the Examiner alleged that Schweer taught scaling of samples at col. 8, line 50 to col. 10, line 15. (Office Action at p.3). These passages repeatedly teach the adjustment of an RMS voltage or RMS current value, where the RMS value is derived from waveform samples. It is respectfully submitted that the Examiner has misinterpreted Schweer by equating adjustment of an RMS value with adjustment of a waveform sample value.

For the foregoing reasons, Schweer fails to disclose or suggest each and every element of claim 16. As a consequence, it is respectfully submitted that the rejection of claim 16 is in error and should be withdrawn.

D. Claims 17-19 and 25

Claims 17-19 and 25 also stand rejected as allegedly being anticipated by Schweer. Claims 17-19 and 25 all depend from and incorporate all of the limitations of claim 16. Accordingly, for at least the same reasons as those set forth above in connection with claim 16, it is respectfully submitted that the rejection of claims 17-19 and 25 should be withdrawn.

IV. Claim 26

Claim 26 stands rejected as allegedly being obvious over Schweer in view of Horowitz and Hill. Claim 26 depends from and incorporates all of the limitations of

claim 16. The Examiner cited Horowitz and Hill as allegedly teaching the use of an EEPROM. (Office Action at p.6). Even if it were obvious to combine the teachings of Horowitz and Hill to incorporate an EEPROM into the device of Schweer, the resulting combination would nevertheless fail to arrive at the invention of claim 26 for at least the same reasons as those set forth above in connection with claim 16. Accordingly, it is respectfully submitted that the obviousness rejection of claim 26 should be withdrawn.

V. New Claim 37

New claim 37 is directed to an arrangement for use in an electricity meter that is coupled to an external transformer to measure electricity consumption on a power line. The arrangement is operable to compensate for measurement errors and includes a source of digital measurement signals, a memory, and a processing circuit. The source of digital measurement signals includes an internal sensor circuit and an analog-to-digital conversion circuit. The source of digital signal measurement signals is operably coupled to receive power consumption signals from the external transformer. The memory stores data representative of at least one error rating for the external transformer. The processing circuit is operably coupled to the source of digital measurement signals to receive digital measurement signals therefrom. The processing circuit is operable to obtain at least one electricity consumption measurement value corresponding to at least a part of the digital measurement signals. The processing circuit is also operable to adjust the at least one electricity consumption measurement value using at least a portion of the stored data.

Claim 37 is similar to claim 16, except that claim 37 does not include a limitation directed to the adjustment being made specifically to a voltage or current sample. As discussed in pages 18 and 19, different embodiments of the invention may either adjust current or voltage samples, *or* adjust derived energy values such as watt-hours and the like. Claim 37 also differs from claim 16 in that it recites a source of digital signals that includes an internal sensor circuit and an analog to digital converter circuit. Ample support for these amendments may be found throughout the application as originally filed. (See Application at pp.3-4; p.11, lines 10-16; p.12, lines 7-17; pp.20-21).

A. Schweer Does Not Teach Calibration of Internal and External Devices

Schweer does not teach an apparatus having an internal sensor device that connects to an external transformer. Instead, Schweer only teaches a digital circuit that connects to one or more external transformers.

To this end, it is noted that Schweer is not directed to an ordinary utility meter having an internal sensor device. Instead, Schweer actually teaches a specialized, unique form of meter wherein a number of toroids are used to form a number of sensors which then feed a digital energy calculation arrangement. (See Schweer Figs. 7 & 8, and generally at col. 1, lines 15-50). In effect, the external toroids and the digital calculation arrangement combine to form a specialized kind of meter.

Schweer does not address the problems presented by connecting an ordinary metering device (i.e. one which includes its own sensor devices such as current transformers) to a pre-installed external transformer, such as an instrument transformer.

For the foregoing reasons, it is respectfully submitted that new claim 37 is allowable over the prior art. New claims 38-40 depend from claim 37 and are allowable for at least the same reasons.

VI. Conclusion

For all of the foregoing reasons, it is respectfully submitted that the application is in a condition for allowance. Favorable reconsideration and allowance of this application is, therefore, earnestly solicited.

Respectfully Submitted,



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